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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/632,089

08/01/2003

Olav Tirkkonen

59643-00238

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32294

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06/20/2006

SQUIRE, SANDERS & DEMPSEY L.L.P.

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TYSONS CORNER, VA 22182

EXAMINER

NGUYEN, DUC M

ART UNIT

PAPER NUMBER

2618

DATE MAILED: 06/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/632,089	TIRKKONEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Duc M. Nguyen	2618	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

This action is in response to applicant's response filed on 4/10/06. Claims 1-23 are now pending in the present application. **This action is made final.**

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims **1, 18, 23** are rejected under 35 U.S.C. 102(a) as being anticipated by **Sadjadpour et al** (US 2001/0055332).

Regarding claim **1**, **Sadjadpour** discloses a communication system for transferring data between a transmitter and a receiver over a plurality of channels, the communication system comprising:

- modulation circuitry having a plurality of modulation alphabets providing a set of bit loading sequences (see [0027]);
- circuitry for determining a power allocation for at least one bit loading sequence based on minimizing an error rate (see Fig. 6, and [0038], [0043] through [0048] regarding bit and power allocation algorithm for a selected function to be optimized and the selected function 62 for minimizing bit-error-rate BER); and
- circuitry for selecting a bit loading sequence with a lowest error rate (see [0038], [0044], [0045] regarding function 62 for minimizing BER).

Regarding claims **18, 23**, the claims are rejected for the same reason as set forth in claim 1 above.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims **2-13, 19-20, 22** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Sadjadpour** in view of Applicant's admitted prior art (Fig. 1-2 and [0005]-[0023]), hereafter, AAPA.

Regarding claim **2**, **Sadjadpour** discloses all the claimed limitations, see claims 1 above, except for a MIMO system. However, one skilled in the art would recognize that the method as taught by Sadjadpour would be applicable to the MIMO system and would work equally well. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Sadjadpour's teaching to the MIMO system in AAPA as well, for providing a MIMO system as claimed, for improving performance of a communication device (i.e., increase transmission capacity by utilizing additional dimensionalities of sub-channels created by the multiple transmit and receive antennas).

Regarding claims **3-4, 9, 11-13**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, it is clear that **Sadjadpour** as modified would disclose power weighting and plurality of antennas and OFDM channels as claimed (see AAPA, [0008]-[0018], and **Sadjadpour**, [0033]).

Regarding claims **5-6**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, **Sadjadpour** would disclose a “fixed” data rate as claimed (see **Sadjadpour**, [0038]-[0039] regarding a “desired” data rate).

Regarding claims **7-8**, the claims are rejected for the same reason as set forth in claim 2 above. In addition, **Sadjadpour** discloses a channel quality is measured at the transmitter and receiver as claimed (see **Sadjadpour** [0029] regarding noise PSD).

Regarding claim **10**, the claim is rejected for the same reason as set forth in claim 9 above. In addition, since one skilled in the art would recognize the need of increasing transmission power for weak channels in order to satisfy a minimum signal-to-noise ratio requirement for transmission, it would have been obvious to one skilled in the art at the time the invention was made to modify **Sadjadpour** for allocating greater power weighing to weaker channels as claimed, in order to meet a minimum channel quality requirement for transmission.

Regarding claims **19-20, 22**, the claims are interpreted and rejected for the same reason as set forth in claim 3 above.

5. Claims **14-17, 21** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Sadjadpour** in view of AAPA and further in view of **Kim et al** (2003/0128769).

Regarding claim **14**, the claim is rejected for the same reason as set forth in claim 1 above. In addition, since codings and modulations that utilize system bits and parity bits are known in the art as disclosed by **Kim** (see Fig. 3 and [0076], [0077]), it would have been obvious to one skilled in the art at the time the invention was made to incorporate Kim's teaching to **Sadjadpour** for coding data into a plurality of modulation schemes utilizing system bits and parity bits as claimed, in order to provide a suitable modulation and coding scheme in accordance with the channel quality condition (Kim's motivation).

Regarding claim **15**, the claim is rejected for the same reason as set forth in claim 14 above. In addition, **Sadjadpour** as modified would disclose the parity bits are transferred on a weak channel (see **Kim**, [0104]).

Regarding claim **16**, the claim is rejected for the same reason as set forth in claim 15 above. In addition, **Sadjadpour** as modified would disclose the parity bits are transferred on a weak channel (see **Kim**, [0104]) and the power allocation is reduced (see **Kim**, [0098] regarding more transmission power to a good channel).

Regarding claim **17**, the claim is rejected for the same reason as set forth in claim 15 above. In addition, as disclosed by **Kim**, a modulation scheme for a good channel condition would either comprise only systematic bits or a combination of systematic bits and parity bits (see Fig. 3, [0076], [0077]). Therefore, when a combination of systematic bits and parity bits is used for interleavers, the parity bits would be transferred in a least significant bits as claimed (this is a common way for

interleaving systematic bits and parity bits, wherein the systematic bits would be transferred in a most significant bits).

Regarding claim **21**, the claim is rejected for the same reason as set forth in claim 15 above.

### ***Response to Arguments***

6. Applicant's arguments filed 4/10/06 have been fully considered but they are not persuasive.

As to claims 1, 18, 23, regarding a power allocation algorithm, Applicant contends that Sadjadpour does not teach or disclose circuitry or methodology for determining a power allocation for at least one bit loading sequence based on minimizing an error rate, as recited in each of claims 1, 18, and 23. The power values shown in Sadjadpour are determined solely on the selection of the bit loading of each of the modulation alphabets and there is no variability of the power allocation of the selected bit loading in order to minimize an error rate, as recited in Applicants' claims.

In response, the Examiner asserts that Sadjadpour does teach a methodology for determining a power allocation for at least one bit loading sequence based on minimizing an error rate, as recited in each of claims 1, 18, and 23.

In fact, since Sadjadpour does teach a bit and power allocation algorithm for a selected function to be optimized (see Fig. 6 and [0045], [0046]), and since the selected function to be optimized comprises a function 62 that minimizes the BER (see [0044]), it

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is clear that Sadjadpour would teach, or implicitly teach, a bit and power allocation algorithm for minimizing BER, this would read on the claimed limitation

“circuitry for determining a power allocation for at least one bit loading sequence based on minimizing an error rate; and  
circuitry for selecting a bit loading sequence with a lowest error rate”.

Also note that since Sadjadpour does teach that the bit allocation algorithm and power allocation needed are re-calculated and re-sorted (see [0038]), it is clear that there is variability of the power allocation of the selected bit loading in order to minimize an error rate, as recited in Applicants' claims.

As to claims 19-20, 22, the same argument/response regarding the power allocation feature as mentioned above can also be applied here.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, since the use of a MIMO system for improving performance (i.e., increase transmission capacity) of a communication device is well known in the art, one skilled in the art would recognize the benefit of the MIMO system in Applicant's admitted prior art (AAPA) to incorporate



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Sadjadpour's teaching to the MIMO system in AAPA as well, for providing a MIMO system as claimed, for improving performance a communication device.

For foregoing reasons, the examiner believes that the pending claims 1-23 which rely on the patentability of a power allocation feature are not allowable over the cited prior art.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. **Any response to this final action should be mailed to:**

Box A.F.

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

(571) 273-8300 (for **formal** communications intended for entry)

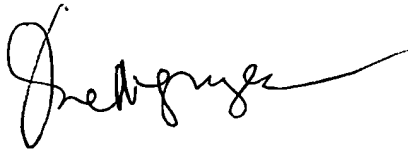
(571)-273-7893 (for informal or **draft** communications).

Hand-delivered responses should be brought to Customer Service Window,  
Randolph Building, 401 Dulany Street, Alexandria, VA 22314.

Any inquiry concerning this communication or communications from the examiner  
should be directed to Duc M. Nguyen whose telephone number is (571) 272-7893,  
Monday-Thursday (9:00 AM - 5:00 PM).

Or to Matthew Anderson (Supervisor) whose telephone number is (571) 272-  
4177.

Duc M. Nguyen, P. Ex.

A handwritten signature in black ink, appearing to read 'Duc M. Nguyen', with a long, sweeping horizontal line extending to the right.

June 14, 2006